

careful discussion of the real meaning of the transformation of the Axolotl into Amblystoma. Experiments are detailed showing that the metamorphosis may be induced with much constancy by obliging the Axolotls, at a proper stage of growth, to leave the water, when they lose their gills and undergo a number of other changes constituting a veritable metamorphosis. Dr. Weismann states that many zoologists have expressed an opinion (which was formerly held by himself) that this change is to be considered to be a true advance in development from a species which had hitherto remained in the larval stage, but which, through the influence of certain changed conditions, now advances, *per saltum*, to a higher stage. This view he gives many excellent reasons for considering to be quite erroneous; holding that the facts are best interpreted by supposing that the animal formerly underwent metamorphosis, but that owing to changed conditions it was unable to survive in the perfect state, and therefore remained in the larval condition in which it acquired the power of reproduction.

The causes which led to this change are believed to be a progressive drying up of the Mexican lakes (as long since proved by Humboldt), and a consequent increased aridity of the atmosphere inimical to land amphibia. The axolotl, therefore, presents us with a case of degeneration; and its metamorphosis under changed conditions in confinement is not due to any advance in organisation, but is really a reversion to a not very remote ancestral habit. The whole of the facts at present ascertained with regard to these animals and allied forms in their native habitats, are shown to agree well with this view, which is quite in harmony with the author's explanation of seasonal dimorphism in butterflies, given in Part I. of the same work (see NATURE, vol. xxii. p. 141), and is also more in accordance with the true principles of evolution than the alternative hypothesis.

The second, and concluding essay, is entitled "On the Mechanical Conception of Nature," and is chiefly occupied with an inquiry into the true character of variation as the chief factor in evolution, and into the comparative importance of external conditions, and the constitution of the organism in determining the particular direction of the course of development; the object being to show that all takes place according to fixed laws without the interference of any "teleological principle," whether in the form of a "phyletic vital force" or the interposition of any "designing power." The writers whose views on these subjects are combated are Von Hartmann and Karl Ernst von Baer, and, after an elaborate and often subtle argument, Dr. Weismann concludes that the facts can all be explained on "mechanical" principles, or, as we should say, by the action of fixed laws. He is however careful to add that this does not imply a materialistic view of nature. "Those who defend mechanical development will not be compelled to deny a teleological power, only they would have, with Kant, to think of the latter in the only way in which it can be conceived, viz. as a *Final Cause*." And on the great question of the nature and origin of consciousness he thus expresses himself:—"If it is asked, however, how that which in ourselves and in the remainder of the animal world is *intellectual* and *perceptive*, which *thinks* and *wills*, is ascribable to a mechanical process of development—whether the deve-

lopment of the mind can be conceived as resulting from purely mechanical laws? I answer unhesitatingly in the affirmative with the pure materialist, although I do not agree with him as to the manner in which he derives these phenomena from matter, since thinking and extension are heterogeneous things, and one cannot be considered as a product of the other." And he intimates that the fundamental notion of conscious matter may get us out of the difficulty. However this may be, he maintains that the theory of selection by no means leads—as is always assumed—to the denial of a teleological Universal Cause, and to materialism, but only to the belief that any mode of interference by a directive teleological power, other than by the appointment of the forces producing the phenomena, is, to the naturalist, inadmissible. "The final and main result of this essay will thus be found in the attempted demonstration that the mechanical conception of Nature very well admits of being united with a teleological conception of the Universe."

The work, of which the translation has now been completed by Mr. Meldola, must be considered a very important contribution to the theory of Natural Selection, since it applies that theory to explain in the minutest detail how the more prominent characters of several distinct groups of animals, not obviously useful to them, may have been developed under its action. Such are the distinct markings often occurring in two annual broods of butterflies termed "seasonal dimorphism," the origin of the markings of caterpillars, and the unexpected phenomena of the transformation of the Mexican axolotl; and we are therefore led to conclude that an equally careful and minute study of other cases of difficulty would probably lead to an equally satisfactory explanation. This argument is not, however, conclusive, because the cases here chosen may not be really test cases; and among the countless forms of nature, and especially among the higher animals, there may well be characters or organs the origin of which are due to other and altogether unknown causes. To students of evolution, Dr. Weismann's volume will be both instructive and interesting, but it is a work that requires not merely reading, but study, since its copious facts and elaborate chains of argument are not to be mastered by a hasty perusal. The book is beautifully got up and illustrated by a number of coloured plates admirably executed in chromo-lithography, and it will form a handsome as well as an indispensable addition to every naturalist's library.

ALFRED R. WALLACE

#### OUR BOOK SHELF

*Land and Freshwater Mollusca of India.* Edited by Lieut.-Col. H. H. Godwin-Austen, F.R.S., &c. Part I. February, 1882. (London: Taylor and Francis.)

THIS work is announced as "supplementary to Messrs. Theobald and Hanley's 'Conchologia Indica,'" but it is much more than a supplement, and is framed on far more scientific principles. The "Conchologia Indica" was published in 1870; and the editors in their preface say that "after an interval of two or three years it is hoped that materials for a supplement (the malacological portion of which will be edited by Major Godwin-Austen) will be accumulated." The "Conchologia Indica," however,

is only what it professed to be—"Illustrations of the Land and Freshwater Shells of British India." The letterpress gives a dry list of species and synonyms, not arranged in classified order, with occasional notes. This is admitted by the editors, who state that they "do not acknowledge the validity of many of these species, but merely illustrate them." They also state their "regret that the figures of some of the more minute shells are not so well executed as they expected; but lithography is scarcely compatible with sharp definition." We fully concur in the last remark. Although this is not a review of their work, we cannot help noticing the fact that certain species of freshwater shells belonging to the northern portion of British India, and which are enumerated in the "Conchologia India," are also natives of Europe. Such are *Limnæa auricularia* and *stagnalis* of Linné, *L. peregra* and *truncatula* of Müller, and *Valvata piscinalis* of Müller; but there is no species of *Unio*, *Anodonta*, *Sphærium*, or *Pisidium* common to the two regions. The occurrence of the first-named five species in countries so geographically and widely separated, may be partly explained by these species having spread from Siberia, which they likewise inhabit; but the mode of their original distribution from Europe to Siberia, or *vice versa*, still remains a problem. If water-fowl or other animals had been instrumental in such distribution, why should not any of the freshwater bivalves, which are likewise European and Siberian, have been similarly transported to British India?

The present work is intended to be published in parts, of which the first has now appeared. It contains seventeen octavo pages of letterpress and four quarto plates. The descriptions of new species, as regards both the shell and soft parts or animal, have been most carefully written, and the author has properly given the distinctive characters of each species in a correlative order, which is a point of material assistance in comparing one species with another. There are, nevertheless, a few exceptions to this useful rule in species of *Kaliella* and *Microcystina* (pages 5, 12, and 13), where the umbilicus is described first, and before the shape of the shell. The shells are admirably drawn, although the colouring is unsatisfactory. Without having critically studied the specimens figured, and especially "a hatful" of them, one might, on looking at the illustrations, be inclined to question the specific distinction of several. But all naturalists are never likely to agree in that matter; and perhaps it may be immaterial whether certain forms are called species or varieties. The minds of some naturalists have a synthetic and of others an analytic tendency.

Col. Godwin-Austen seems to attach considerable importance to the odontophore or lingual ribband as an element of classification. We believe that this affords a good auxiliary character in defining genera or higher groups of the Solenoconchia and Gastropoda; but the recent investigation of the subject by Herr Friele in respect of northern species of *Buccinum* shows that the odontophore varies so greatly in individuals of the same species that it cannot be fully relied on for distinguishing species. Some Gastropods, e.g. *Odostomia* and *Eulima*, have no odontophore, in consequence of their food consisting of soft polyparies.

The work now noticed is a very valuable contribution to the natural history of India, and has been intrusted to a naturalist who is by no means less competent because he is actuated by modest aspirations.

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*Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux.* 2<sup>e</sup> série, tome iv. 3<sup>e</sup> cahier. (Bordeaux, 1881.)

THIS cahier contains nine papers, all mathematical. We recently called attention (vol. xxv. p. 408) to an article in

the second cahier, by M. Paul Tannery, on the Arithmetic of the Greeks. The same writer now furnishes two contributions—one, "Sur la mesure du cercle d'Archimède," in which he discusses how far Archimedes (in his *κύκλου μέτρησις*) was acquainted with methods which form the base of the solution of what is now called the Pellian problem; the second is entitled "De la Solution Géométrique des problèmes du second degré avant Euclide," and in it he discusses questions very nearly allied to those considered by Dr. Allman in his "Greek Geometry from Thales to Euclid."

M. Ordinaire de Lacalouge also contributes two papers—one on the tramways of Bordeaux ("en regardant poser les rails et marcher les premières voitures des tramways on a tout naturellement l'idée de rechercher le rayon minimum des courbes où ces véhicules peuvent circuler. Ils ont, sous certains rapports, de l'analogie avec les wagons de chemin de fer, mais en différent, surtout par leur vitesse de translation"); the second discusses the "théorie géométrique du pendule de Foucault" as against M. Yvon de Villarceau; it is modestly written, and is valuable from its furnishing many interesting historical references. Regarding the views broached in the article, the author concludes with "le temps dira si c'est une illusion."

M. Kowalski, in a "Note sur les systèmes coordonnés d'unités électriques spécialement sur celui de l'Association Britannique et ses applications," does good work in giving a concise elementary account of these systems of units, "notions que les traités classiques de physique publiées jusqu'ici en France passent à peu près complètement sous silence."

The remaining four papers are by M. Saltel, viz. "Réflexions sur la mesure du volume de la sphère" (with a demonstration); "Étude de la variation du cercle osculateur en un point M d'une section plane d'une surface"; "Théorèmes généraux sur la décomposition des enveloppes, théorème sur les surfaces développables"; "Contribution à la théorie du changement des variables dans le calcul des intégrales simples et multiples."

*On and Off Duty: being Leaves from an Officer's Note-Book.* By S. P. Oliver. (London: W. H. Allen and Co., 1881.)

THE chief contents of this handsome volume are derived from the rough notes and sketches made by Capt. Oliver, some years ago, when a young subaltern of artillery. They show that, whether in Turania, Lemuria, or Columbia, he took notes of all the strange things he saw, and although many of his observations have appeared from time to time in the journals or proceedings of various societies, or as articles in periodicals, they were, we think, interesting enough to be collected into a more permanent form, which we trust may stimulate others of Her Majesty's officers to follow Capt. Oliver's example.

The first part of the volume is devoted to an account of the author's visit to China and Japan. There is a graphic description of the visit to Tsing-Yuen, to see that the treaty (1860) of peace was properly posted up as required. Snakes are mentioned as abounding; and we learn that snake's flesh is eaten from choice not rarely by the Chinese: indeed, boiled-snake soup is a favourite febrifuge for invalids. The author says that at Shao-K'ing numerous bodies of the rebels were floating past with the stream, and that though the majority were decapitated, all the bodies of the men floated on their backs, whereas all the bodies of the women floated "face downwards." The notes on Japan are of interest, as intercourse with foreigners is so improving the Japanese, that such peculiar games as Jon-noki are not now-a-days to be commonly seen played; and the author was fortunate to see Yeddo ere it ceased to be the exclusive city.